REMARKS

Applicants' counsel thanks Examiner Asinovsky for her careful and thorough examination of the present application.

Claim 19 has been canceled herein, and new dependent claims 20-31 have been added to recite additional novel combinations supported by the specification. Claims 12, 14, 15 and 17 have been amended to more clearly describe the invention as claimed. No new matter has been entered. Basis for the amendments to these claims, as well as for the new claims, can be found in the specification as-filed.

Claims 15, 17 and 19 have been rejected under 35 USC § 112, second paragraph for alleged indefiniteness, and claim 19 has been rejected under 35 USC § 101 as being an improper process claim. Regarding claim 15, the Examiner has argued claim 15 is redundant in view of claim 12 because "[a] broad recitation 'a composite material comprising a polymer' includes nothing more that [sic than] a polymer-grafted natural fibers, wherein the polymer is a polyether in claim 12." As best understood, the Examiner appears to be arguing that claim 15 is of substantially the same scope as claim 12. Applicants respectfully disagree. Claim 12 is directed to a *fiber* whereas claim 15 is directed to a *composite material* comprising, *inter alia*, fibers. While claim 15 may include some or all of the limitations of claim 12, it is *not of the same scope* and therefore is not redundant over claim 12. Applicants are entitled to claim their invention in as many different ways as they choose, so long as no two claims are of *identical* scope. Because claims 12 and 15 are not of *identical* scope, the latter is not redundant of the former as the Examiner has suggested, and the Section 112 rejection of these claims must be withdrawn.

With respect to claim 17, the Examiner has argued analogously as above that claim 17 is redundant in view of claim 14. For the same reasoning as above, this rejection also must be withdrawn because the two claims are not of *identical* scope; claim 14 is directed to a fiber and claim 17 to a composite material comprising, *inter alia*, fibers.

With respect to claim 19, that claim has been canceled without prejudice, thus obviating the Section 112 and 101 rejections thereof.

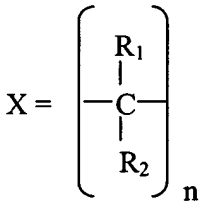
Claims 12 and 15 have been rejected under 35 USC § 102(b) as being anticipated over either Coleman-Kammula (hereinafter "Coleman") or Lawrie. These claims now have been amended to specify that the polyether grafted onto the natural cellulose fibers recited in each of these claims has the following structure:

$R[-O-X-]_m$

where:

m is between 1 and 200;

R is an aliphatic or aliphatic/aromatic group; and



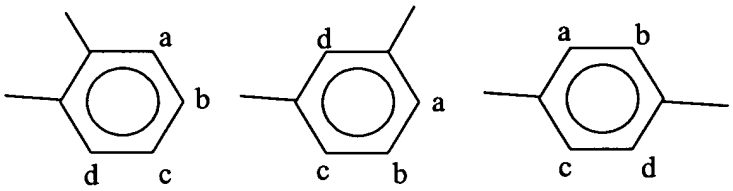
where:

n is between 1 and 20; and

R_1 is the same as or different from R_2 and is either hydrogen or a linear or branched aliphatic group,

or

X = one of the following:



wherein at least one of positions "a", "b", "c" and "d" has attached thereto a substituting group which may be the same as or different from other substituting groups that can be attached at other of the positions "a", "b", "c" and "d", said substituting group or groups being selected from the group consisting of halogens, linear C_1-C_4 alkyl groups and branched C_1-C_4 alkyl groups.

Neither Coleman nor Lawrie discloses a polyether-grafted natural cellulose fiber wherein the polyether has the structure as now recited in each of claims 12 and 15. Specifically, the electrophilic epoxy groups discussed in Coleman and cited by the Examiner do not read on the structure recited in claims 12 and 15. Regarding Lawrie, that reference discloses a process for decorating cellulose fibers with an alkylene oxide *monomer*, such as ethylene oxide or propylene oxide, or a derivative thereof such as glycide. Col. 1 lines 17-22. That is, the species decorated (grafted) to the surface of the cellulose fibers are monomers, *not polymers*. No indication is given, whatsoever, in Lawrie that polymers are or even can be used; the species are introduced to the relevant reactions as monomers (e.g. ethylene oxide

gas or ethylene oxide dissolved in inert solvent-- col. 1 lines 47-52, or propylene oxide or glycide in their native liquid states --col. 1 line 54- col. 2 line 2). See, further, Example 1 wherein ethylene oxide is provided in a 1:1 molar ratio with the glucose units of cellulose ("cellulose reckoned as $C_6H_{10}O_5$"). Were polymerization of the ethylene oxide monomers contemplated, one would have expected a substantial excess of the monomer to permit the formation of polymeric chains of some length. Such was not the case in Lawrie because that reference clearly contemplates decorating (grafting) the cellulose surface only with monomers, and not the polyether chains whose structure is recited in claims 12 and 15 (which are *polymers*).

In view of the foregoing, it is respectfully submitted that the rejections of pending claims 12 and 15 have been overcome, and it is requested the Examiner reconsider and withdraw the pending rejections.

Claims 14 and 17 have been rejected under 35 USC § 103(a) as being obvious over Lee in view of GB 1,590,176 (hereinafter GB'176). Each of these claims also has been amended similarly as claims 12 and 15 above, to define the structure of the polyether that is grafted to the natural cellulose fibers. There is no combination of Lee and GB'176 that fairly discloses or suggests the polymer-grafted natural cellulose fibers (or a composite containing such fibers) in claims 14 and 17 as amended. In particular, the Examiner has recognized that Lee does not disclose a functionalized polyether at all, so clearly that reference does not disclose the polyether structure now claimed.

Regarding the Examiner's reliance on GB'176 in combination with Lee to disclose the necessary polyethers, it is submitted respectfully that this combination does not describe the invention as now claimed, and in any event that the combination of Lee with GB'176 is inappropriate and cannot support a Section 103 obviousness rejection for at least the following reasons.

First, there is no motivation to combine these references. Lee is directed to graft copolymers useful to impart desirable properties to textile materials. See ABSTRACT of Lee. Conversely, GB'176 is directed to reacting hydrate cellulose used to make sausage casings with an "alkylamide- and/or alkylamine-bis-dimethylene-triazinone-tetramethylol with a synthetic polymer, which may be non-branched or branched, or may be a mixture of branched and non-branched material, based on alkylene oxide and having at least one terminal N-methylol carbamate group," together with water and optionally a secondary

chemical plasticizer. GB'176 at page 2 lines 8-35. The two references are concerned with entirely divergent fields, the former aiming to improve or alter the quality of cellulose-composed textile materials, and the latter aiming to improve the elasticity and reduce brittleness of sausage casings so that the casings do not split and so excess sausage material is not caused to be undesirably extruded from the casing as a result of increased internal pressure due to casing shrinkage. See pp. 1-2 of GB'176. There is absolutely no reason to expect or believe that one of ordinary skill in the art, starting from Lee, would look to GB'176 to find an alternative mode of grafting polymer chains onto a natural cellulose backbone, to substitute for the radical-initiated polymerization method disclosed in Lee. In particular, it is not even clear what the end product achieved in GB'176 is, as the hydrate cellulose in that reference is reacted with a number of different reagents that doubtless will impart additional or different, potentially incompatible, chemistry compared to Lee.

Second, even assuming the combination were proper, the two references when combined do not remotely disclose the structure now described in claims 14 and 17. Specifically, the Examiner has recognized that Lee does not disclose a functionalized polyether, and has relied on GB'176 to supply the necessary teaching. However, GB'176 describes and utilizes chemical modifications of cellulose hydrate, which is not a "*natural cellulose fiber*" as recited in the claims. A principal advantage to the claimed invention is that natural cellulose fibers can be grafted with the described polyether polymers to impart desired characteristics, namely surface compatibility with plastic resins, but without substantially altering the basic structure of the natural cellulose fibers which imparts to them their strength. The chemically modified *cellulose hydrate* described in GB'176 is entirely inconsistent with the use of "natural cellulose fibers" as claimed, and one would not have considered it obvious to attempt a modification described in GB'176 to supplant the radical-initiated polymerization graft procedure described in Lee, particularly when the two references are not even directed to similar fields of art, or to similar products or problems to be addressed. In addition, even ignoring the foregoing points GB'176 cannot be said fairly to suggest to one of ordinary skill in the art to graft a functionalized polyether onto a natural cellulose molecule as a substitute for the radical-initiated polymerization reaction using a polymerizable monomer that is used in Lee, because there is no indication whatsoever that the chemistry from GB'176 would result in the desired structure. In this regard, it is noted in GB'176 the cellulose hydrate is reacted with

1) an alkylamide- and/or alkylamine-bis-dimethylene-triazinone-tetramethylol;

2) a synthetic polymer based on alkylene oxide and having at least one terminal N-methylol carbamate group;

3) water; and optionally

4) a secondary chemical plasticizer.

It is in no way evident this reaction will produce the polymer grafted cellulose fibers described in either Lee (i.e. as a substitute for the radical-polymerized graft polymers described therein) *or in claims 14 and 17 now pending*. Chemistry is a highly unpredictable art, and there cannot be considered to be any reasonable expectation of success to implement the chemistry from GB'176 to produce a polymer-grafted fiber as in Lee or as claimed in claims 14 and 17, starting from Lee. While applicants do not dispute that GB'176 may list a number of oxyalkylene species at pp. 13-16, it is inappropriate simply to take those structures and suggest it would be obvious to use them in a different reference with no regard for the chemical context in which they appear or are used in the reference in which they are found.

Third, the motivation cited by the Examiner to combine the Lee and GB'176 references is not a correct motivation and misunderstands the cited passage from Lee. Specifically, the Examiner has argued it would have been obvious to make the combination because

> any additional functionalized polyether for treating a cellulose material is expected in Lee invention as being an additional hydroxyl-containing polymers grafted on to a cellulose backbone, Lee, column 2, lines 10-12.

Office action, page 4.

Respectfully, the cited passage from Lee refers not to species that can be used as the graft polymer species for adhering to cellulose backbones, but to other species that can serve *as the backbone*, i.e. cellulose derivatives and other hydroxyl-containing polymers *to which can be grafted* the radical-initiated polymers therein described. In other words, the cited passage describes alternatives for the backbone cellulose fibers that can be used in Lee, and **not** to alternatives for the graft polymer. Hence, the motivation to combine the references proposed by the Examiner is incorrect, and does not support the combination of Lee with GB'176.

In view of the foregoing, it is respectfully submitted that the rejections of claims 14 and 17 also have been overcome, and that these claims now are in condition for allowance.

New claims 20-31 also have been added to claim additional novel features and combinations thereof which are not anticipated or made obvious by the prior art of record. Accordingly, it is urged respectfully that new claims 20-31 are independently allowable, and it is requested these claims, (or those of them which the Examiner regards as being allowable), be so indicated in the next communication from the Examiner.

All the claim rejections having been overcome and all claims now being in condition for allowance, early notice to that effect respectfully is requested.

Should the Examiner have any questions or concerns regarding the instant submission, or for any other reason which may advance the prosecution of this case, she is requested please to contact the undersigned attorney at the phone number listed below.

If there are any additional fees required by this communication, please charge the same to our Deposit Account No. 16-0820, Order No. 38264US1.

Respectfully submitted,

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